

deposition of an immediately consecutive formation, or after a longer or shorter interval during which other formations might be deposited, the same marine population might reappear in the same locality and give rise to identical organic *débris*, enclosed in superior strata. Thus are formed what are termed *colonies* in Geology. It is probable, however, that this phænomenon could only present itself when the same species had continued to live in the interval, perhaps exceedingly reduced in number, in some other locality. We have nevertheless shown how it may happen that remains of perfectly identical species may pass into rocks of a nature quite different, and deposited by very different seas.

7. There probably exist no formations immediately superposed upon each other, no consecutive faunas and floras, without certain organisms being common to both. The number of common species may vary between 0·01 and 0·10.

8. When, however, in certain localities there have been sudden movements of the soil, heating of the crust of the earth, emissions of sulphurous vapours, carbonic acid, or other injurious gases, long interruptions in the formation of deposits, upheavals of strata, &c., it most frequently happens that the passage of species from one stratum to another is more rare than when the deposits have been formed regularly and without any interruption.

9. The average absolute duration of organisms was sufficiently long to give us no reason for astonishment at the important differences presented by species in this respect, although the history of these species is often told us only by strata of but slight thickness, so that it often happens that we regard as simultaneous, phænomena which have been separated by long periods of time.

[To be continued.]

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VIII.—*Observations on the Shell and Animal of Hybocystis, a new genus of Cyclostomidæ, based on Megalomastoma gravidum and Otopoma Blennus, B.; with Notes on other living Shells from India and Burmah.* By W. H. BENSON, Esq.

DR. PFEIFFER has divided the genus *Megalomastoma* into three sections:—1st, *Hainesia*, which he considers to be possibly distinct generically; 2nd, *Farcimen*, Troschel; and, 3rd, *Megalomastoma* proper. In the first section, characterized by its oval aperture, angular above, he places the Siamese *M. Myersi*, Haines, *M. croceum*, Sow., and *M. bifasciatum*, Sow. The operculum is unknown. In *Farcimen* he has included my Burmese *M. gravidum*, together with other species provided with the normal thin cor-

neous operculum of *Megalomastoma*, but distinguished by the thickness of the circular peristome from the typical forms.

I am indebted to Capt. Haughton, late magistrate of Moulmein, for two specimens of *M. gravidum*, each with the operculum *in situ*. Its nature and construction at once announced that the separation of the form from *Megalomastoma* was absolutely necessary. The thick calcareous shield is many-whorled externally, and peculiarly convoluted on the inner surface. The generic term "*Hybocystis*" has reference to the form of the typical shell.

A comparison with the thin, similarly convoluted operculum of *Otopoma Blennus*, B., from the same locality, induced a suspicion that the latter shell was merely the young of *Hybocystis grvida*, notwithstanding the abrupt termination of the last whorl of that part in *O. Blennus*; and finding, on forcibly withdrawing an operculum, that the foot, head, tentacula, and eyes adhering to it were quite fresh and moist, and evidently in a living state, and the operculum of one of the specimens of *Hyb. grvida* opposing even greater resistance to the attempts made to separate it, I took measures for the re-animation of the animal, as well as of other specimens of *O. Blennus*; and, in spite of the apparent emptiness of the whorls, with the exception of a small portion near the aperture, I succeeded in making the animals of both forms move about freely, when their absolute identity in colour and conformation placed the fact of their being the adult and young of the same species beyond a doubt. The form of the now obsolete species, *O. Blennus*, coincides with that of the spire of *Hybocystis grvida* before it assumes its lengthened and distorted phase.

In treating *H. grvida* as the type of a new genus, I have been guided by the following considerations, in addition to the structure and substance of the operculum. The character assigned to *Hainesia*, Pfr., viz. the oval mouth, angulate above (as recorded in the 'Mal. Blätter' for 1856, and partly copied in the 'Monographia Pneum.' Supp. 1858), would at once exclude from that section or genus the Moulmein shell, even if any of the three species included in it, in consequence of possessing that sole feature in common, should be found to be provided with a calcareous operculum. I doubt whether the two West Indian forms in the section will present opercula formed on the same type as that of the Siamese shell with which Dr. Pfeiffer has associated them; but as the diagnosis of the section is quite inapplicable to the Burmese species, I have no hesitation in conferring on the latter a distinct generic appellation. If eventually *M. Myersi* should exhibit an operculum similar to that of *Hybocystis*, it will necessarily have to drop its connexion with *Hainesia*, the name of

which must then be restricted to the other species presenting oval peristomes as their title to distinction under that term, whether sectional or generic.

### HYBOCYSTIS, nobis, nov. gen.

Testa distorte ovata; anfractus penultimus antice supra aperturam planatus; apertura (species typicæ) circularis, callum internum superne sinuatum, a peristomate interiore sulco profunde excavato divisum, exhibens.

Operculum testaceum, crassum, extus concaviusculum, plurispiratum, anfractibus sensim accrescentibus, ultimo extus ætate sensim attenuato, junioris abrupte desinente, intus  $1\frac{1}{2}$ -spiratum, epidermide cornea nitida vestitum, medio foveato-umbonatum, anfractu ultimo elevato priores partim celante.

In *H. grvida* the animal is pale; the foot short and oval, slightly pointed posteriorly, the sole plane and entire; the muzzle short, and emarginate in front and centre, the lateral lobes short and rounded; tentacula ringed, grey, moderate, and subulate; eyes black, on a pale prominence or tubercle at the outer base of the tentacula, and sessile on the head, not on the side of the tentacula. The operculum is carried towards the right side, and nearly at the extremity of the foot. A bright reddish organ occupies the lingual region internally.

The examination of living specimens of *Otopoma clausum*, Sow., from Kattiwâr, enables me to contrast the animal of that shell with *Hybocystis*. In *O. clausum* the foot is moderate in length, and composed of two long, narrow, parallel soles separated by a deep sulcus, and having also a deep sinus between them at either end. The muzzle is greatly elongated, emarginate in front; and the lateral lobes are capable of considerable extension. The tentacula are moderate, hyaline, ringed, tumid, and obtuse at the extremity. The eyes are prominent on the outer side of the tentacula near their base, not sessile on the head.

On communicating to Mr. Theobald a remark on the peculiar sole of this animal, he stated that he had noticed it, and that its use was to enable the species to cling to the thin stems of the branches of the shrub which it frequented near the shore of Gopnâth Point, on the Gulf of Cambay. The leaves which he forwarded were kindly examined for me by Sir. W. J. Hooker, and were pronounced to be those of *Grewia betulifolia*, DeCand., an inhabitant also of Arabia, whence Sowerby's type specimens of *O. clausum* were procured.

The head of a young *Hybocystis* was forwarded to Mr. Woodward, for examination of the lingual teeth, on the 14th inst.



When viewed in conjunction with the external characters of the animal and the form of the shell, they will eventually serve to give an accurate idea of the relations of the genus with the rest of the family.

I have four other Moulmein shells living—*Pupina artata*, B., *Helix Achatina*, Gray, *Helix pylaïca*, B., and *Rhaphaulus Chrysalis*, Pfr. The three former creep about briskly, and have allowed their form to be ascertained. The retiring habits of *Rhaphaulus*, which shelters itself under leaves, and obstinately refuses to expose itself while under observation, withdrawing quickly into its shell when uncovered, have hitherto prevented me from making a description of it. *Helix Achatina* and *pylaïca* differ widely in their animals. Specimens of the former having produced, on the 23rd and 26th inst., a single young shell with several whorls, and measuring 6 millimetres in diameter, I am disposed to set the species down as ovoviviparous, no previous deposit of an ovum having been observed on either occasion. The young ones are as agile and fearless as their parents.

The rapidity of our steam-communication with tropical climates, and the knowledge that even land-shells provided with opercula, and to all appearance empty, may be reanimated, ought to stimulate our collectors, in the West as well as in the East, to transmit freshly-taken specimens to Europe for examination. In 1853, specimens of *Cyclophorus Indicus*, Desh., from Bombay, reached me in a living state, after a voyage of four months round the Cape; and one of the specimens of *Otopoma clausum*, which I examined a year ago, is still living, although in a torpid condition. The arrival of *Camptonyx* from Kattiwâr is also a case worthy of remembrance.

Since writing the above, *Rhaphaulus Chrysalis* has moved about sufficiently to allow its main points to be ascertained.

Cheltenham, June 29th, 1859.

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IX.—*Notes on the Animals of Rhaphaulus Chrysalis, Pupina artata, Otopoma clausum, Helix Achatina, and H. pylaïca.*  
By W. H. BENSON, Esq.

IN the account of *Hybocystis gravis*, mention was made of several other Tenasserim species of Mollusca found alive among the shells procured for me by Captains Sankey and Haughton at Moulmein. A few notes on their external characters will prove acceptable to conchologists.